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ABSTRACT

The National Defense Authorization Act for Fiscal Year 2002 directed the U.S. General Accounting Office to determine whether the Department of Defense (DOD) overseas teachers' compensation package is adequate to recruit and retain qualified teachers. The Act also required GAO to determine whether or not any revisions to the law governing DOD overseas teachers' salaries were advisable. This document is a report of the study. The study addressed three questions: (1) What is the compensation package for teachers in DOD overseas schools, and how does it compare with compensation for teachers in the United States? (2) To what extent do DOD overseas schools experience difficulties recruiting and retaining well-qualified teachers? (3) What is the process for determining teacher salaries and paying teachers, and which aspects of the process, if any, could be improved? Following are some of the key findings: On average, salaries for teachers in DOD overseas schools are higher than those for teachers in stateside schools. Despite the compensation package, dissatisfaction exists among DOD overseas teachers over health-care access and costs. DOD appears to have little difficulty recruiting and retaining well-qualified teachers for overseas schools. An appendix describes the scope and methodology of the study. (WFA)

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GAO

Report to Congressional Requesters

December 2002

ED 473 716

DOD OVERSEAS SCHOOLS

Compensation Adequate for Recruiting and Retaining Well-Qualified Teachers

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Highlights

Highlights of GAO-03-19, a report to the Senate and House Armed Services Committees.

DOD OVERSEAS SCHOOLS

Compensation Adequate for Recruiting and Retaining Well-Qualified Teachers

Why GAO Did This Study

The Department of Defense (DOD) overseas schools educate more than 70,000 children of military service members and DOD civilian employees throughout the world. In order to ensure the continued success of this school system, the National Defense Authorization Act for Fiscal Year 2002 directed GAO to assess whether the DOD overseas teachers' compensation package is adequate to recruit and retain qualified teachers. The act also required GAO to determine whether any revisions to the law governing DOD overseas teachers' salaries were advisable.

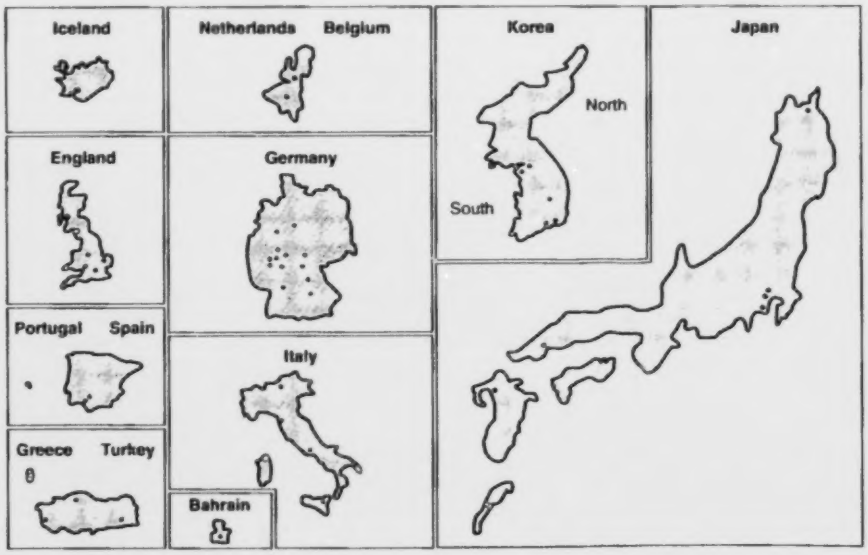
What GAO Found

DOD overseas teachers' compensation compares favorably to that of U.S. teachers. In general, DOD overseas teachers receive a standard federal benefit package, including health and life insurance and coverage under the Federal Employees' Retirement System. Many DOD overseas teachers also receive allowances, such as a living quarters allowance, that U.S. teachers do not receive. On average, salaries for DOD overseas teachers are higher than U.S. teachers' salaries. Despite the generous compensation package, there is some dissatisfaction among overseas teachers regarding health care.

DOD has little difficulty recruiting and retaining well-qualified teachers for overseas schools. In school year 2001-02, DOD recruiters filled over 99 percent of vacant teacher positions. Based on certification, experience, and education, the quality of DOD overseas teachers is high. Virtually all teachers in DOD schools are certified in the subjects or grades they teach. DOD may have some difficulties recruiting and retaining teachers in a few subject areas and geographic locations, but any such difficulties do not appear to threaten the quality of the overseas teachers workforce.

DOD has developed a process for determining and paying teachers' salaries that meets statutory requirements. Although this system is time-consuming and burdensome, techniques that could address these difficulties do not meet legal requirements. Given DOD's success recruiting and retaining well-qualified teachers, it is not advisable at this time to revise the law.

In School Year 2001-02, DOD Operated 155 Overseas Schools in 14 Countries.



Source: DOD.

www.gao.gov/cgi-bin/getrpt?GAO-03-19.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Marnie Shaul, (202) 512-7215.

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Abbreviations

AFT	American Federation of Teachers
DFAS	Department of Defense Finance and Accounting Service
DOD	Department of Defense
DODDS	Department of Defense Dependents Schools
DODEA	Department of Defense Education Activity
FEA	Federal Education Association
FEHB	Federal Employees Health Benefits
FEGLI	Federal Employees Group Life Insurance
FERS	Federal Employees Retirement System
NCES	National Center for Education Statistics
NEA	National Education Association
OEA	Overseas Education Association
OFT	Overseas Federation of Teachers
OPM	Office of Personnel Management
TSP	Thrift Savings Plan

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United States General Accounting Office
Washington, DC 20548

December 12, 2002

The Honorable Carl Levin
Chairman
The Honorable John W. Warner
Ranking Minority Member
Committee on Armed Services
United States Senate

The Honorable Bob Stump
Chairman
The Honorable Ike Skelton
Ranking Minority Member
Committee on Armed Services
House of Representatives

Policymakers are interested in maintaining the high quality of the Department of Defense (DOD) overseas schools in the future. These schools educate over 70,000 children of military service members and DOD civilian employees in 14 foreign countries. In school year 2001-02, DOD operated 155 schools overseas and employed roughly 6,200 instructional staff. Due to congressional interest in maintaining the high-quality of education in these schools, the National Defense Authorization Act for Fiscal Year 2002 directed us to assess whether the DOD overseas teachers' compensation package is adequate to recruit and retain qualified teachers and to recommend any necessary revisions to the law governing DOD overseas teachers' salaries.

To address the issues raised in the mandate, we answered three key questions:

1. What is the compensation package for teachers in DOD overseas schools, and how does it compare with compensation for teachers in the United States?

2. To what extent do DOD overseas schools experience difficulties recruiting and retaining well-qualified teachers?

3. What is the process for determining teacher salaries and paying teachers, and which aspects of the process, if any, could be improved?

To answer these questions, we reviewed laws, regulations, and policies on salary, benefits, and allowances for DOD overseas teachers, as well as for other federal civilian employees overseas. We also examined DOD promotional materials, planning documents, and information provided to DOD overseas teachers. We conducted a literature review on teacher quality, compensation, and demographics in the United States. We analyzed salary data on U.S. teachers and DOD overseas teachers, as well as demographic data on DOD overseas teachers. Finally, we interviewed officials in several DOD offices and representatives of teachers' unions. We performed our work between January and November 2002 in accordance with generally accepted government auditing standards. For additional information on our scope and methodology, please see appendix I.

Results in Brief

The DOD overseas teachers' compensation package is composed of salaries, benefits, and allowances that are set by law and regulations and, in general, compares favorably with U.S. teachers' compensation. DOD overseas teachers' salaries are governed by a 1966 law, which requires that they be equal to teacher salaries in urban school jurisdictions with populations of 100,000 or more. As federal civilian employees, DOD overseas teachers are eligible for a standard federal benefit package, including benefits such as health and life insurance. Many DOD overseas teachers are also eligible for allowances that are set by the U.S. Department of State. For example, they may receive a living quarters allowance for the cost of rent and utilities, among other expenses. On average, salaries for teachers in DOD overseas schools are higher than those for U.S. teachers, and starting salaries for DOD overseas teachers are nearly 6 percent higher than the average starting salary for teachers in the United States. U.S. teachers also do not receive the allowances that many DOD overseas teachers receive. Despite the competitive compensation package, dissatisfaction exists among DOD overseas teachers regarding health care access and costs.

DOD appears to have little difficulty recruiting and retaining well-qualified teachers for overseas schools. In school year 2001-02, DOD recruiters filled over 99 percent of vacant teaching positions in the overseas school system. Statistics on common measures of teacher quality, such as certification and educational attainment, show that the DOD overseas school teacher workforce is highly qualified. For example, virtually all newly hired teachers in DOD overseas schools are certified in the subjects or grades they teach, and roughly two-thirds of DOD overseas teachers hold advanced degrees, compared to 46 percent of public school teachers

in the United States. The quality of the DOD overseas teachers may contribute to the high student-achievement level in these schools. Studies show that teacher quality is a strong predictor of student achievement. In general, DOD appears to have little difficulty retaining teachers. While the agency does not have sufficient empirical data to confirm the absence of retention difficulties, agency officials we spoke with said that any retention difficulties the agency has are limited to specific geographic locations, such as Japan, Korea, and Bahrain. Because DOD is consistently able to fill vacant positions with well-qualified teachers, any retention difficulties that do exist do not appear to threaten the quality of the teacher workforce.

Though the current process for determining and paying teacher salaries is time-consuming, DOD has little flexibility to modify it because of statutory requirements. The law requires that salaries be equal to the average salary for teachers in urban school jurisdictions with populations of 100,000 or more. On the basis of this requirement, DOD collects salary data from more than 230 school jurisdictions in incorporated places of 100,000 or more. The agency collects these data through at least January 10 of each school year in order to meet the requirements of an arbitration agreement with one of the teachers' unions. Because the courts have interpreted the law to mean that DOD must pay overseas teachers the same amount for the same year as the U.S. urban teachers, DOD pays teachers their salary and benefit increases retroactively. Teachers typically receive these increases at or near the end of the school year. The salary determination and payment process creates some administrative burden for the agency. We identified alternative techniques, such as projecting salaries, that could make this process less time-consuming and less burdensome. However, DOD cannot use these techniques because they do not meet legal requirements. Despite any administrative inefficiencies, DOD's success maintaining a high-quality teacher workforce suggests that there is no immediate need to change the law.

Background

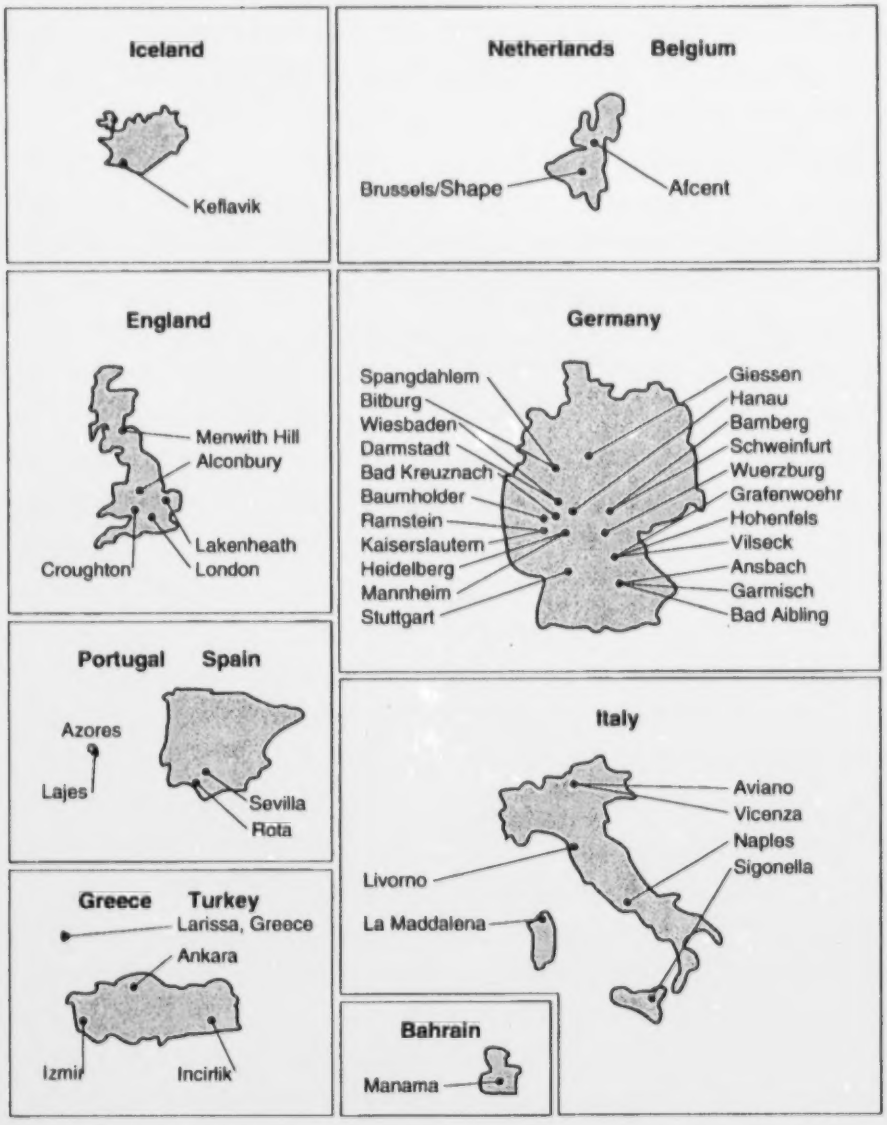
The Department of Defense Education Activity (DODEA) oversees all DOD schools in the United States and abroad. The Department of Defense Dependents School System (DODDS) is the entity within DODEA that manages DOD's overseas schools. In school year 2001-02, DODDS

operated 155 schools in 14 countries[1] (see figs. 1 and 2) and employed roughly 6,200 educators, including both traditional classroom teachers and instructional staff, such as school psychologists, nurses, and counselors. Classroom teachers comprise over 90 percent of all DOD overseas educators. They are represented by two different teachers' unions: the Federal Education Association (FEA) and the Overseas Federation of Teachers (OFT).[2] Although classroom teachers and instructional staff are paid on different salary schedules, both groups are subject to the same salary determination and payment process.

[1]DODDS operates schools in Bahrain, Belgium, Cuba, England, Germany, Greece, Iceland, Italy, Japan, Korea, The Netherlands, Portugal, Spain, and Turkey. DOD schools in Guam and Puerto Rico are part of the Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS).

[2]The Federal Education Association is a unit of the National Education Association; the Overseas Federation of Teachers is an affiliate of the American Federation of Teachers.

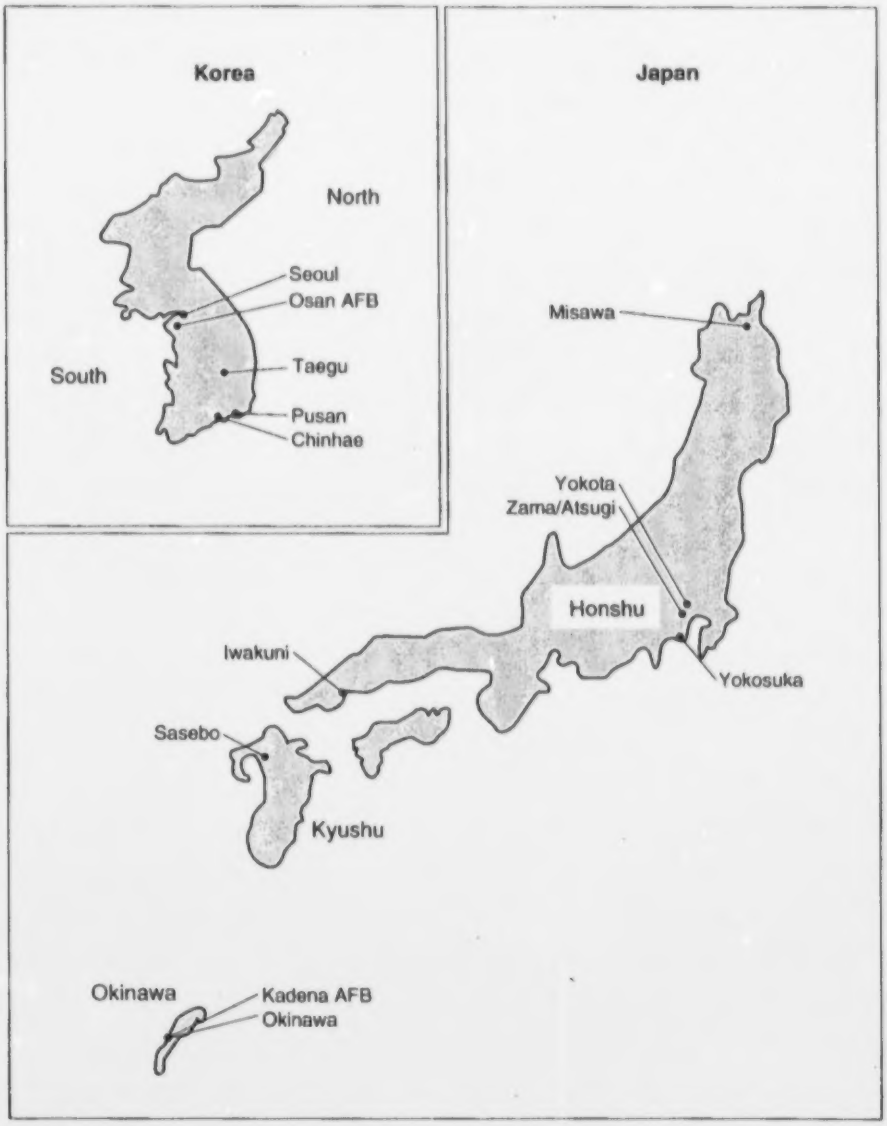
Figure 1: DOD European Area Schools



Source: DOD.

Note: DOD also operates an overseas school in Cuba.

Figure 2: DOD Pacific Area Schools



Source: DOD.

Legal requirements and union arbitration agreements form the basis for the DOD overseas teachers' salary determination process. Prior to 1959, teachers in DOD overseas schools were paid according to the General Schedule, the standard pay schedule for many federal government employees. These salaries did not reflect teachers' academic backgrounds or qualifications. As a result, DOD overseas teachers' salaries were significantly lower than those paid to public school teachers in the United States. Congress attempted to remedy these inequities in 1959 by passing the Defense Department Overseas Teachers Pay and Personnel Practices Act (Pay and Personnel Practices Act).[3] This law directed the heads of each military department in DOD[4] to fix rates of basic compensation "in relation to the rates of basic compensation for similar positions in the United States." However, these rates of compensation could not exceed the highest rate of basic compensation for similar positions of a comparable level of duties and responsibilities under the municipal government of the District of Columbia.

Upon passage of the Pay and Personnel Practices Act, DOD officials met with representatives of the Overseas Education Association (OEA)[6] and the National Education Association (NEA) to develop procedures governing its implementation. In 1960, these parties agreed to establish an annual review of compensation schedules as compared to the rates of compensation in urban school jurisdictions with populations of 100,000 or more.[6] Although all parties agreed to this process, annual per-pupil spending limitations enacted by Congress effectively lowered the compensation paid to DOD overseas teachers below the salary schedule devised through the annual review.[7] To correct this problem, Congress amended the Pay and Personnel Practices Act in 1966 and set into law the

[3]Pub.L. 86-91 (1959).

[4]In 1959, the secretary of each branch of the military was responsible for the overseas schools in that branch.

[5]The OEA was later renamed the Federal Education Association (FEA).

[6]This benchmark was used for comparison "because most of the teachers were recruited from urban areas with a population of 100,000 or more." See *Crawford v. United States*, 179 Ct. Cl. 128 (1967).

[7]Each year between 1961 and 1965, DOD asked for an increase in the per-pupil limitation in order to raise teacher salaries. Congress granted an increase in full only twice during those years. According to the historical background included in *Crawford v. United States*, Congress was apparently reluctant to increase the per-pupil limit because it considered the additional benefits that overseas teachers received as part of their compensation.

procedures that DOD and the teachers' associations had agreed to in 1960.[8] The amendment provides that DOD fix the basic compensation for overseas teachers at rates equal to the average of the range of rates of basic compensation for urban school jurisdictions with populations of 100,000 or more.[9]

Since 1966, the DOD overseas teachers' salaries have been the subject of numerous legal actions. Among the most significant for their impact on DOD's salary determination and payment process are a class action law suit in 1973 and an arbitration decision in the early 1980s. In 1973, seven DOD overseas teachers sued the U.S. government, claiming that DOD's methods for determining teacher salaries were inconsistent with the Pay and Personnel Practices Act. Specifically, the teachers argued that DOD's process of determining teacher salaries based on the previous year's salaries in U.S. school jurisdictions resulted in salaries unequal to those paid to teachers in the United States. The court ruled that timing was an essential component of compensation and that, therefore, salaries used for comparison purposes should be from the same school year.[10] The result of this court case was the establishment of the payment system that DOD currently uses to determine and distribute salary payments to DOD overseas teachers.

In 1982, an arbitration decision was issued, which resolved a grievance the OEA filed relating to the salary schedule that had been set for school year 1979-80. In part, the OEA contested DOD's use of an August 1, 1979, cut-off date for salary data because it excluded the salary increases that many U.S. school teachers received in the second half of the school year. The arbitrator held that by using the August 1 date, DOD did not meet the statutory requirement that it set salaries "equal to the average of the range of rates" of the group of teachers identified in the statute. Subsequently, DOD and OEA reached an arbitration agreement, which requires DOD to

[8]In responding to the committee's request for comment, the Bureau of the Budget argued that the amendment would result in rates above the national average for similar positions in the United States and should include data from cities with smaller populations, which "would provide a broader and more realistic comparison with non-Federal salaries and would be more consistent with practices for other Federal white-collar positions."

[9]Although the amendment states that DOD overseas teachers' salaries be based on salaries in U.S. urban school jurisdictions with populations of 100,000 or more, DOD has interpreted this to mean school districts in urban or "incorporated" places with populations of 100,000 or more. Pub.L. 89-391 (1966).

[10]*March v. United States*, 506 F.2d 1306 (D.C. Cir. 1974).

collect salary information for its annual survey through at least January 10 of each school year. The Department of Defense Civilian Personnel Management Service, Wage and Salary Division conducts this survey and generates the DOD overseas teachers salary schedule each year.[11]

DOD Overseas Teachers' Compensation Package Is Set by Law and Regulations and Generally Compares Favorably with That of U.S. Teachers

The DOD overseas teachers' compensation package, which includes salary, benefits, and allowances, is set by law and regulations and generally compares favorably with U.S. teachers' compensation. Since 1966, DOD overseas teachers' salary schedules have been set equal to average teacher salaries in school districts in incorporated places with 100,000 or more people. Their benefits are set by regulations published by the U.S. Office of Personnel and Management (OPM). DOD overseas teachers also may receive allowances determined by the U.S. Department of State and additional services, such as access to on-base gyms and social clubs. The compensation package generally compares favorably with compensation for U.S. teachers. Starting and average salaries for DOD overseas teachers are higher than those of teachers in the United States. U.S. teachers typically do not receive the allowances and services that many DOD overseas teachers receive. While the compensation package generally compares favorably with that of U.S. teachers, it appears that many teachers are dissatisfied with access to health care in many overseas locations.

DOD Overseas Teachers' Salaries Set by Law, and Benefits and Allowances Set by Regulations

The Defense Department Overseas Teachers Pay and Personnel Practices Act, as amended in 1966, requires that DOD overseas teachers' salaries be equal to average salaries in U.S. urban school districts. DOD overseas teachers are paid on a salary schedule, which reflects both their level of education and years of experience. (See table 1 for the school year 2001-02 salary schedule.)

[11]DOD overseas teachers are schedule C federal employees. Pay schedule C applies to elementary, middle, and high school classroom teachers and teachers of English as a Second Language, Special Education, Reading Improvement Specialists, Vocational/Technical Instructors, and Nurses. In addition to the schedule C pay plan, using the same survey process, the Wage and Salary Division creates salary schedules for substitute teachers, social workers, guidance counselors, psychologists, management and education specialists, principals, and assistant principals.

Table 1: Overseas Educators School Year 2001-02 Salary Schedule for Schedule C Employees: Comprehensive Schedule for Educators and Specialists

	Teachers' Level of Education						
Step	BA	BA+15	BA+30	MA	MA+15	MA+30	Doctorate
1	31,775	32,840	33,905	34,970	36,035	37,100	38,165
2	32,920	34,070	35,225	36,375	37,525	38,680	39,830
3	34,065	35,300	36,545	37,780	39,015	40,260	41,495
4	35,210	36,530	37,865	39,185	40,505	41,840	43,160
5	36,355	37,760	39,185	40,590	41,995	43,420	44,825
6	37,500	38,990	40,505	41,995	43,485	45,000	46,490
7	38,645	40,220	41,825	43,400	44,975	46,580	48,155
8	39,790	41,450	43,145	44,805	46,465	48,160	49,820
9	40,935	42,680	44,465	46,210	47,955	49,740	51,485
10	42,080	43,910	45,785	47,615	49,445	51,320	53,150
11	43,225	45,140	47,105	49,020	50,935	52,900	54,815
12	44,370	46,370	48,425	50,425	52,425	54,480	56,480
13	45,515	47,600	49,745	51,830	53,915	56,060	58,145
14	46,660	48,830	51,065	53,235	55,405	57,640	59,810
15	47,830	50,045	52,325	54,540	56,755	59,035	61,250
16	49,000	51,260	53,585	55,845	58,105	60,430	62,690
17	50,170	52,475	54,845	57,150	59,455	61,825	64,130
18	51,340	53,690	56,105	58,455	60,805	63,220	65,570

Notes: "15+" means 15 graduate credit hours; "30+" means 30 graduate credit hours.

Steps 15, 16, 17, and 18 are not annual steps. Rather, they are longevity steps payable upon completion of 4 years service in steps 14, 15, 16, and 17, respectively.

Source: DOD.

As federal civilian employees, many DOD overseas teachers are eligible for a variety of other benefits in addition to basic compensation (salary). In general, federal civilian employees are eligible to participate in the Federal Employees Health Benefits (FEHB) program and the Federal Employees Group Life Insurance (FEGLI) program and are covered by the Federal Employees' Retirement System (FERS), which includes the Thrift Savings Plan (TSP).[12] However, not all DOD overseas educators are eligible for these benefits. The type of appointment a teacher holds can alter the benefit package he or she receives. For example, federal employees hired as temporary employees with appointments not to exceed 1 year are not

[12]Some employees may be covered under the Civil Service Retirement System, the Federal retirement program prior to FERS. In general, these employees were hired by the Federal government before FERS became effective on December 31, 1983.

eligible for health insurance.[13] Although DOD overseas teachers hired in the United States are mostly permanent employees and therefore eligible for all benefits, local hires[14] (teachers residing and hired abroad) are often employed under time-limited appointments. However, local hires who are on time-limited appointments can be converted to permanent appointments once they meet all requirements, which allows them to receive full benefits. In addition, almost all local hires are spouses of military and DOD civilian personnel and thus receive these benefits indirectly through their spouses.

In addition to salary and benefits, some teachers are also eligible to receive allowances such as a living quarters allowance, a post (cost-of-living) allowance, and the cost of shipment of household goods and an automobile. These additional allowances are the same as those available to other DOD civilian employees stationed overseas and similar to those available to other federal employees stationed overseas. These allowances are primarily governed by regulations set by the Department of State.[15] DOD has some flexibility to limit these allowances, but may not exceed the scope of the regulations set by State.[16] For instance, although State allows civilian employees overseas to receive an education allowance, the wardrobe portion of Home Service Transfer Allowance, and the wardrobe portion of the Foreign Transfer Allowance, DOD overseas teachers do not receive them.[17] See table 2 for an explanation of each allowance available to DOD civilian employees stationed overseas.

[13]If these employees continue in their temporary positions beyond 1 year, they become eligible for health insurance. In this instance, the employee must pay both the employee's and employer's share of the premiums.

[14]A local hire is an employee who was offered and appointed to a position in the same foreign area where he or she was already residing.

[15]These regulations are outlined in the Department of State Standardized Regulations (DSSR).

[16]DOD rules concerning these allowances can be found in the Department of Defense Civilian Personnel Manual 1400.25-M, Subchapter 1250, "Overseas Allowances and Differentials."

[17]The wardrobe portion of these allowances is intended to offset the cost of clothes for those employees relocating to significantly different climates.

Table 2: Allowances Available to DOD Civilian Employees Stationed Overseas

Allowance	Description
Advance of pay	Up to 3 months salary may be advanced when assigned to a foreign post.
Danger pay	Percentage of basic compensation (15, 20, or 25%) paid for imminently dangerous conditions when the official U.S. community is the target of political violence.
Difficult-to-staff incentive differential	Percentage of basic compensation (15%) for serving at an agency-determined difficult-to-staff post, which has a 20% or 25% post differential.
Educational travel allowance	Allows for one round trip annually between schools attended in the United States and the foreign post of assignment, which is primarily intended to reunite a full-time undergraduate college, technical, or vocational school child with the employee/parent serving the U.S. government in the foreign area.
Evacuation payments	Paid when an employee/family member(s) are authorized or ordered to evacuate a foreign post.
Extraordinary quarters allowance	Provided when employee and family members must partially or completely vacate permanent quarters during foreign tour due to circumstances that make the kitchen or entire home uninhabitable.
Foreign transfer allowance	Available when transferring from the United States to a foreign area or between foreign areas to help defray the cost of moving, such as temporary lodging, meals, vehicle registration, and a driver's license.
Foreign travel per diem allowance	Consists of lodging, meals, and incidental expenses.
Home service transfer allowance	Available when transferring from a foreign area back to the U.S. as long as the employee agrees to work 12 more months for the U.S. government. This is also available to family members who relocate to the United States following the death of the employee assigned overseas.
Living quarters allowance	Provided for private leased quarters in lieu of government- provided housing intended to cover most if not all expenses for rent, utilities, and other allowable expenses.
Permanent change of station (PCS) travel	Paid when an employee is transferred or reassigned to another geographical locality through a permanent change-of-station move requiring a residence relocation.
Post ("cost of living") allowance	Paid when the overall cost of goods and services at the foreign post are at least 3% above the cost of the same goods and services in the Washington, D.C., area.
Post ("hardship") differential	Percentage of basic compensation (5, 10, 15, 20, and 25%) for environmental conditions significantly worse than the United States.
Renewal agreement travel (RAT)	Government furnished round trip transportation for the purpose of returning home to take leave between overseas tours upon completion of prescribed tour of duty and after entering into a new transportation agreement at an overseas post.
Separation travel allowance	Government furnished return travel to the employee's place of actual residence when separating from Federal service; employee must meet certain requirements to receive this allowance.
Separate maintenance allowance	Paid to help maintain family member(s) at other than the foreign post of assignment.
Temporary quarters subsistence allowance	Assists with "temporary" lodging, meals, laundry, and dry cleaning in the foreign area prior to occupying permanent quarters (for up to 150 days) or upon final departure from the foreign post after vacating permanent quarters.

Sources: Department of State, Summary of Allowances and Benefits, 2001, and Department of Defense, Joint Travel Regulations (JTR), volume 2.

Generally, these allowances are available only to teachers who are recruited in the United States. These allowances (except post allowance and danger pay, which all teachers are eligible for, regardless of where they are hired) are not considered salary supplements or entitlements.

Rather, they are intended to be recruitment incentives for U.S. citizen employees living in the United States to accept employment in foreign areas. In each of the last 2 years, over 90 percent of locally hired teachers were spouses of active duty military or DOD civilian employees. Thus, though these teachers may not be eligible for these allowances in their own right, they do receive them through their spouses. Furthermore, locally hired teachers may become eligible for these allowances if transferred to a new post.

DOD Overseas Teachers' Compensation Package Generally Competitive with U.S. Teachers', but Health Care an Issue

DOD overseas teachers' salaries compare favorably to U.S. teachers' salaries. On average, salaries for teachers in DOD overseas schools are higher than the U.S. national average teacher salary.[18] The average salary in DOD overseas schools for school year 2000-01 was $47,460, while the national average for the same year was $43,250. On a comparative basis, the average DOD overseas teacher's salary ranked the twelfth highest among average teacher salaries in the 50 states and the District of Columbia for school year 2000-01. (See table 3.)

Table 3: DOD Overseas Teachers' Average Salary Compared to Average Salaries of U.S. Teachers by State, School Year 2000-01

Rank	State	Average Salary
1	Connecticut	53,507
2	California	52,480[a]
3	New Jersey	51,955
4	New York	51,020[a,g]
5	Michigan	50,515[a]
6	Rhode Island	50,400[a]
7	Pennsylvania	49,528
8	District of Columbia	48,488[a]
9	Alaska	48,123
10	Illinois	47,865[a]
11	Massachusetts	47,789[c]
12	**DODDS**	**47,460**
13	Delaware	47,047
14	Maryland	45,963
15	Oregon	44,988[a]

[18]The difference in average salaries may, in part, reflect the higher level of experience and educational attainment among DOD overseas teachers, compared to the average U.S. teacher.

Rank	State	Average Salary
16	Nevada	44,234[b]
17	Indiana	43,000
18	Ohio	42,892
19	Minnesota	42,212[c]
20	Washington	42,143
21	Georgia	42,141
22	North Carolina	41,496
23	Wisconsin	40,939[c]
24	Hawaii	40,536
25	Virginia	40,247[c]
26	Colorado	39,184
27	Texas	38,359
28	New Hampshire	38,301
29	Vermont	38,254
30	Florida	38,230
31	South Carolina	37,938
32	Alabama	37,606[e]
33	Tennessee	37,413
34	Idaho	37,109
35	Kentucky	36,688[c]
36	Arizona	36,502
37	Iowa	36,479[c]
38	Utah	36,441
39	Maine	36,373
40	West Virginia	35,888
41	Kansas	35,766[c]
42	Missouri	35,091
43	Arkansas	34,729[d]
44	Wyoming	34,678[e]
45	Nebraska	34,258
46	Louisiana	33,615[c]
47	New Mexico	33,531[e]
48	Montana	33,249
49	Oklahoma	32,545[f]
50	Mississippi	31,954[e]
51	North Dakota	30,891
52	South Dakota	30,265

[a]American Federation of Teachers estimate.

[b]Includes employer portion of employee pension contribution where applicable.

[c]Includes extra-duty pay.

[d]Includes health care contributions where applicable.

[e]Includes employer pension contribution and extra-duty pay where applicable.

[f]Estimated to exclude fringe benefits at 6 percent in Oklahoma.

[a]Median salary includes extra-duty pay.

Sources: American Federation of Teachers and Department of Defense.

In the same year, the starting salary for a DOD overseas teacher with a Bachelor of Arts (BA) degree ($30,700) was 6 percent higher than the average starting salary in the United States ($28,986) for a teacher with a BA. Furthermore, if starting salaries for DOD's overseas teachers with a BA in school year 2000-01 are included in the ranking of average, starting salaries in each state and the District of Columbia, the DOD overseas school system ranked twelfth highest. (See table 4.)

Table 4: DOD Overseas Bachelor of Arts Teachers' Starting Salary Compared to Average Starting Salaries of U.S. Teachers with BAs by State, School Year 2000-01

Rank	State	Average Salary
1	Alaska	36,293
2	California	33,121
3	New York	32,772[a]
4	Delaware	32,281
5	Connecticut	32,203[a]
6	District of Columbia	31,889
7	Georgia	31,314[a]
8	Illinois	31,222[a]
9	Pennsylvania	31,127
10	Massachusetts	31,115[a]
11	New Jersey	30,937[a]
12	**DODDS**	**30,700**
13	Maryland	30,321
14	Texas	29,823
15	North Carolina	29,786
16	Nevada	29,413[b]
17	Michigan	29,401[a]
18	Rhode Island	29,265
19	Hawaii	29,204
20	Alabama	28,649[a]
21	Virginia	28,139
22	Tennessee	28,074
23	Oregon	27,903[b]
24	Indiana	27,311
25	Washington	27,284
26	Missouri	27,173
27	Oklahoma	27,016[c]
28	Minnesota	27,003
29	Arizona	26,801[a]

Rank	State	Average Salary
30	Colorado	26,479[a]
31	South Carolina	26,314
32	Wisconsin	26,232
33	Vermont	26,152[a]
34	Louisiana	26,124[a]
35	Iowa	26,058
36	Kansas	26,010[a]
37	New Mexico	25,999[a]
38	Florida	25,786
39	Kentucky	25,027
40	New Hampshire	25,020[a]
41	Ohio	24,894
42	West Virginia	24,889
43	Wyoming	24,651[a]
44	Utah	24,553
45	Arkansas	24,469[g]
46	Nebraska	24,356
47	Maine	23,689
48	Idaho	23,386
49	Mississippi	23,292
50	South Dakota	22,457
51	Montana	21,728
52	North Dakota	20,675

[a]American Federation of Teachers estimate.

[b]Includes employer portion of employee pension contribution where applicable.

[c]Includes extra-duty pay.

[d]Includes health care contributions where applicable.

[e]Includes employer pension contribution and extra-duty pay where applicable.

[f]Estimated to exclude fringe benefits at 8 percent.

Sources: American Federation of Teachers and Department of Defense.

While U.S. teachers generally receive similar benefits to those of DOD overseas teachers, they do not receive the allowances that overseas educators generally receive, such as the living quarters allowance. In addition to these allowances, DOD overseas teachers often have access to military base stores, which sell discounted and duty-free goods, and to recreational facilities on base, such as gyms and social clubs.

Although DOD overseas teachers receive the standard health care benefit for U.S. civilian government employees,[19] employees stationed overseas face challenges with regard to health care access. Representatives of teachers' unions told us that there is dissatisfaction among teachers with access to health care in many overseas locations. In addition, in July 2001, the Assistant Secretary of Defense for Force Management Policy reported that "the availability and cost of medical care for DOD educators employed overseas is a significant problem."[20] While civilian employees are often allowed to use military treatment facilities, access to these facilities for civilian employees is on a space-available basis.

Civilian employees stationed overseas, like the DOD teachers, are limited to fee-for-service insurance plans because no health maintenance organizations are available in foreign posts. Whether care is provided at military or host nation facilities, civilian employees must pay when services are rendered and request reimbursement by their medical insurance. This can often mean large out-of-pocket expenses for doctor's visits and treatments.[21] In addition, health care providers at military medical treatment facilities are not recognized as authorized preferred providers by the health plans available to overseas employees, so reimbursement rates are often lower than for preferred providers in the United States. Furthermore, when civilian employees must use host nation medical facilities, they often face challenges, such as differences in language, culture, and health practices. For example, a teacher may have difficulty explaining his or her medical history to a doctor who does not speak English. DOD is unable to change the health insurance available to civilian DOD employees, including the DOD overseas teachers, because their health insurance package is set by a governmentwide policy for civil servants.

[19]Employees who are spouses of active duty military personnel can receive health care benefits through their spouses.

[20]Assistant Secretary of Defense, *Report on Compensation, Allowance Structure, and Access to Medical Services for DOD School Teachers in Overseas Areas* (Washington, D.C. 2001).

[21]Military treatment facilities do bill other insurance companies for inpatient services, but they do not have the capability to bill for outpatient services.

DOD Appears to Have Little Difficulty Recruiting and Retaining Well-Qualified Teachers for the Overseas School System

In general, DOD has been successful in recruiting and retaining well-qualified teachers. In school year 2001-02, DOD recruiters filled almost all vacant teaching positions in overseas schools. The DOD overseas teacher workforce is highly qualified, with virtually all DOD overseas teachers certified in the subjects or grades they teach. DOD also does not appear to have difficulty retaining teachers, although some agency officials and a representative of a teachers' union suggested retention difficulties exist in a few specific geographic areas.

DOD Generally Successful Recruiting Well-Qualified Teachers

In school year 2001-02, DOD recruiters filled over 99 percent of vacant classroom teaching positions. More than one agency official we spoke with confirmed that DOD has little difficulty recruiting teachers for overseas schools. This year, DOD has received approximately 8,500 teaching applications, far more than the approximately 900 teaching positions available. DOD's success in filling vacancies appears consistent across the 10 districts in which its overseas schools are located. The lowest success rate for filling classroom teaching vacancies in school year 2001-02 was 99.77 percent (for vacancies in the Heidelberg, Germany district), while 7 of the 10 districts filled all their vacancies for that school year.

The availability of teachers and the attractiveness of the DOD overseas schools to potential hires may be factors that aid recruitment. DOD has a ready supply of potential teachers living abroad. Roughly one-third of DOD overseas teachers are hired locally. In school year 2001-02, spouses of military or DOD civilian employees made up 47 percent of new hires. It is DOD policy to give them preference over teaching candidates living in the United States when applying to the system, provided that they are qualified. DOD overseas schools also have qualities that make them attractive to teachers. Representatives of teachers' unions indicated in interviews that the excitement of living abroad combined with the familiarity of working in an American school attracts many teachers to the DOD overseas school system. In addition, DOD's recruitment video cites the system's competitive pay and benefits as a reason for joining the system.

DOD's vigorous recruitment program may also contribute to DOD's success attracting applicants. Recruitment activities include job fairs; a student teaching program; advertisements in professional, military, and on-line publications; participation in the Troops to Teachers program;[22] and on-site recruitment at college campuses. In recent years, DOD recruitment personnel have focused on enhancing the diversity of their teacher workforce. To that end, they have established student teaching agreements with Historically Black Colleges and Universities and the Hispanic Association of Colleges and Universities to attract minority applicants. As part of its recruitment efforts, DOD has also developed an on-line application system for teaching candidates in order to facilitate the application process. Since this system was made available, the number of applicants to the system has more than doubled. Another important recruitment tool is the use of advance job offers, offers made to applicants before actual vacancies have been identified and that do not specify a job location. The advance offers program is used to help DOD overseas schools compete with U.S. school districts for exceptional educators because U.S. schools tend to make job offers well in advance of the DOD overseas schools. Advance offers are also used to recruit minority teachers and increase the diversity of the DOD overseas teacher workforce.

While recruitment is generally successful, agency officials and representatives of teachers' unions have indicated that DOD experiences some difficulties recruiting teachers for certain subjects, such as special education, math, and science. It is not surprising that DOD has some difficulty recruiting teachers for these subjects. According to a 1996 report by the National Center for Education Statistics (NCES), 20-29 percent of U.S. public schools with vacancies in the subject areas of bilingual and special education, math, science, and English-as-a-Second-Language report difficulty filling them.

DOD officials also report challenges filling vacancies in some locations. According to DOD officials and representatives of the teachers' unions, areas like Japan, Korea, and Bahrain are not as attractive to teachers because the culture and language are significantly different from their own. Of the 20 substitute teachers hired to fill full-time positions by DOD

[22]Troops to Teachers is a federal program that helps discharged and retired military personnel become certified and employed as teachers in public schools.

in school year 2001-02, 19 were located in schools in Japan.[23] This figure suggests that while DOD may be able to fill virtually all of the vacancies in that country, it must use some nonpermanent teachers to do so. DOD can fill positions in less desired locations by sending teachers there from other schools in the system. All teachers sign mobility agreements upon accepting permanent employment with DOD, which allows the agency to send them wherever they are needed, though administrators seek to avoid compulsory reassignment. At the same time, DOD can pay teachers recruitment bonuses, a tool that could help the agency address any recruitment difficulties. DODEA recently received authority to pay these bonuses and has not yet offered any. While it may be more difficult to recruit teachers for some subject areas and locations, DOD's success filling vacant positions with well-qualified teachers suggests that any recruitment difficulties are relatively minor.

Based on Certification, Experience, and Education, the Quality of DOD Overseas Teachers Is High

DOD overseas teachers are well-qualified, with virtually all teachers in DOD schools certified in the subjects or grades they teach.[24] Almost two-thirds of DOD overseas teachers hold advanced degrees, compared to 46 percent of public school teachers in the United States. Further, 73 percent of DOD teachers have at least 10 years of teaching experience.

These well-trained teachers could be a major factor behind the schools' high student-achievement level, an indication of the strength and success of the DOD overseas school system. Research has linked teacher quality to student performance. Data show that students in DOD overseas schools perform above the national average on the National Assessment of Educational Progress (NAEP) and the Terra Nova Achievement Test. For example, in 1998, only two states had a higher percentage than the DOD overseas schools of eighth graders who performed at a proficient or higher level on the writing portion of the NAEP. Notably, DOD overseas schools have made significant progress in closing the performance gap between minority and white students. Compared to state-by-state rankings of minority eighth graders in 2000, DOD minority eighth graders ranked second on NAEP math scores.

[23]This figure applies to classroom teachers for school year 2001-02 only, not to all instructional staff.

[24]U.S. General Accounting Office, *BIA and DOD Schools: Student Achievement and Other Characteristics Often Differ from Public Schools'*, GAO-01-934 (Washington, D.C.: Sept. 28, 2001).

DOD Generally Appears to Have Little Difficulty Retaining Teachers

Agency officials and representatives of teachers' unions told us that, in general, DOD overseas schools do not have a problem retaining teachers. While the agency does not have sufficient data to calculate retention rates by location, agency officials we spoke with said that any retention difficulties the agency has are limited to a few geographic areas, such as Korea, Japan, and Bahrain. In addition, union representatives told us that teachers who join DOD's overseas school system generally tend to stay in the system for many years. Because DOD is consistently able to fill vacant positions with well-qualified teachers, any retention difficulties that exist do not appear to threaten the quality of the teacher workforce. DODEA recently obtained authorization to offer retention bonuses to teachers, a tool that could be used to address these difficulties. The agency has not yet offered any such bonuses.

The Current Process for Determining and Paying Teacher Salaries Is Time-Consuming, but DOD Has Little Flexibility to Modify This Process Because of Statutory Requirements

DOD has developed a process for determining and paying overseas teachers' salaries to meet the requirements of the law and subsequent court cases and arbitrations. DOD's process for collecting salary information and issuing a new salary schedule for DOD overseas teachers takes roughly 8 months. Once the new salary schedule is set, DOD must pay teachers their annual salary increases, and some allowance increases, retroactively. Teachers typically receive these retroactive payments near the end of the school year. The process for recalculating the teachers' salaries and paying them retroactively causes some administrative burden for the agency, in terms of both workload and cost.

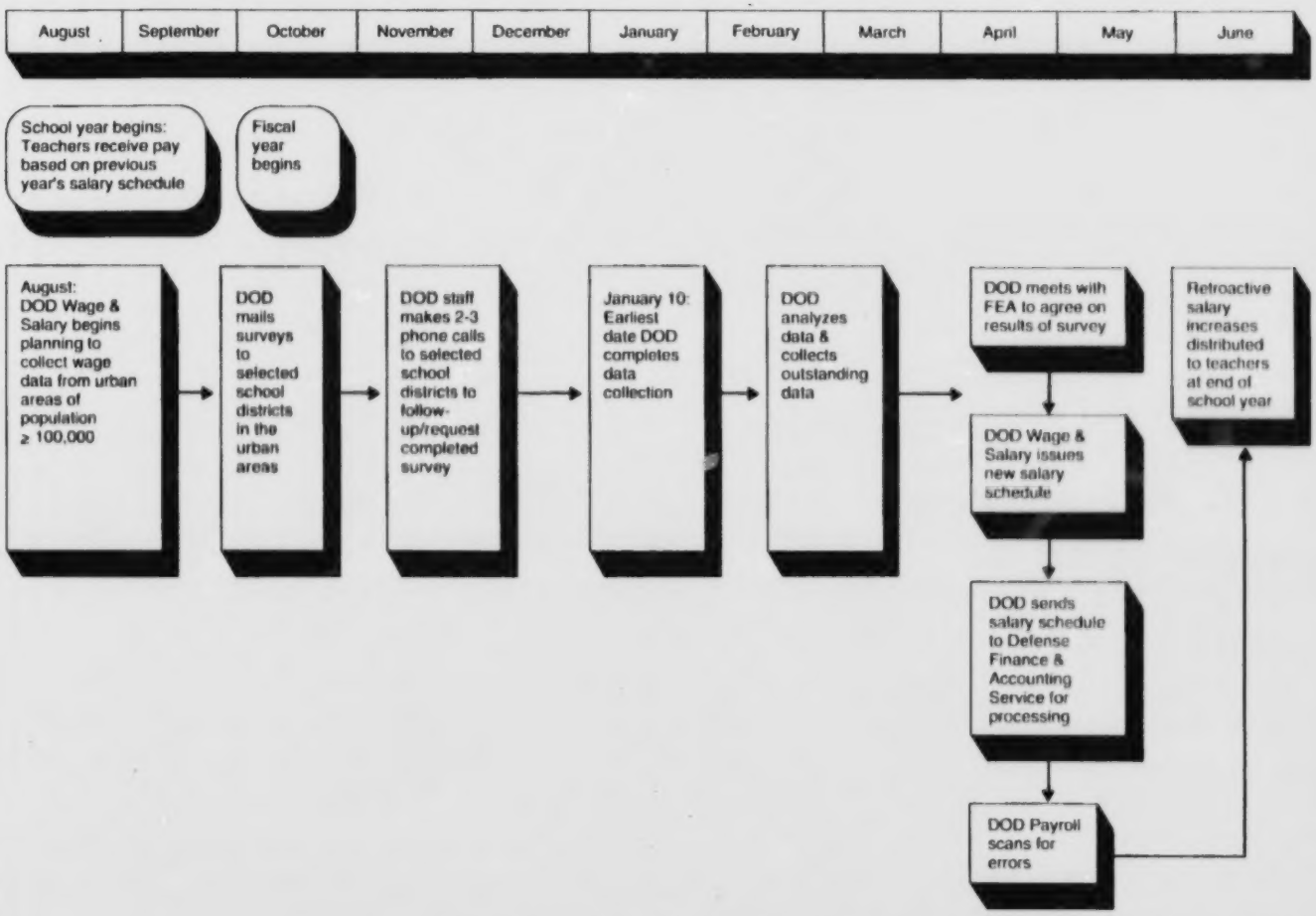
DOD's Process for Determining the Annual Salary Schedule Results in Retroactive Payments and Some Administrative Burden to the Agency

Each year, in order to meet legal requirements, the DOD Wage and Salary Division surveys urban school districts for salary data through at least January 10. It identifies these urban school districts by using the Census Bureau's list of incorporated places with populations of 100,000 or more. For school year 2001-02, the division surveyed 230 school districts. It began planning in August, mailed out surveys in October, and continued data collection—including follow-up calls—through March. The data collection includes information on the minimum and maximum salary paid to a teacher with a BA degree, the minimum and maximum salary paid to a teacher with a Ph.D. degree, the number of pay lanes, the number of regular and longevity steps, and the number of days in the school year. With these data, the Wage and Salary Division calculates a schedule of

earnings for DOD overseas teachers.[25] As part of the calculation for this schedule, the Wage and Salary Division reviews the number of steps and salary lanes in U.S. urban school jurisdictions to ensure comparability. The survey process takes 12 people a total of 1,680 hours (or 42 workweeks) to complete. The salary schedules for the current school year are usually completed in April or May. (See fig. 3.)

[25]As part of this process, the Wage and Salary Division also collects salary data and computes salaries for social workers, school psychologists, guidance counselors, and school administrators.

Figure 3: DOD Overseas Teachers Salary Calculation Process Timeline


August
September
October
November
December
January
February
March
April
May
June
School year begins: Teachers receive pay based on previous year's salary schedule
Fiscal year begins
August: DOD Wage & Salary begins planning to collect wage data from urban areas of population ≥ 100,000
DOD mails surveys to selected school districts in the urban areas
DOD staff makes 2-3 phone calls to selected school districts to follow-up/request completed survey
January 10: Earliest date DOD completes data collection
DOD analyzes data & collects outstanding data
DOD meets with FEA to agree on results of survey
DOD Wage & Salary issues new salary schedule
DOD sends salary schedule to Defense Finance & Accounting Service for processing
DOD Payroll scans for errors
Retroactive salary increases distributed to teachers at end of school year

Sources: DOD, Civilian Personnel Management Service, Wage and Salary Division, and Department of Defense Education Activity.

Once the salary schedules are complete, Wage and Salary Division personnel meet with representatives from the FEA and agency officials to discuss the results of the survey. Once all parties agree on the results, the new salary schedule is issued.

The courts have interpreted the Pay and Personnel Practices Act as requiring that DOD overseas teachers be paid the same salary that the U.S. teachers in DOD's comparison group receive for the same year. Because

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the salary schedule is typically issued near the end of the school year, overseas teachers receive their pay increases retroactively. Usually, the overseas teachers receive these increases just prior to the end of the school year. In addition, since some allowances, such as the post allowance, are based on salary, teachers may also receive retroactive payments for allowance increases.

This retroactive pay process results in some administrative burden for the agency in terms of workload and cost. First, the process increases the agency's workload. DOD spends additional time each year processing, reviewing and entering the pay and allowance increases. The Defense Finance and Accounting Service (DFAS) calculates the amount of each teacher's new salary and retroactive payments, while the DODEA personnel office must correct the official personnel forms[26] for all affected employees. In addition, field staff help recalculate adjustments to any extra duty pay teachers may have received during the year.[27] Once this work is completed, the DODEA payroll office receives the data for record keeping purposes, reviews them, and corrects any coding errors. Second, the process can complicate DODEA's management of its budget. Each year, DOD officials predict how large the retroactive pay increase will be in order to plan the budget. If this prediction is too low, DODEA personnel must find the necessary funds to pay for the difference. Because payroll comprises over 70 percent of DODEA's budget, this task can be a difficult one. A large enough difference in the predicted and actual amounts of the pay increase can have an impact on DODEA's budget. For instance, in school year 2001-02, DODEA officials expected the salary increase to be about 3.6 percent, but it was actually 5.2 percent. As a result, they had to ask the Office of the Secretary of Defense for the necessary funds to address this problem. Finally, the process results in some costs to the agency. DFAS charges DODEA an annual fee for determining and processing the retroactive pay increases. Last year, this fee totaled roughly $78,000.

[26]The Notification of Personnel Action (Standard Form 50), published by the U.S. Office of Personnel Management, is used to notify employees and payroll offices of personnel actions and to record the action in the employee's Official Personnel Folder.

[27]Extra duty pay may be due to teachers who serve as coaches for athletic teams, or advisors for student newspapers, yearbooks, drama clubs, or other extracurricular activities.

Techniques That Could Make the System Less Time-Consuming and Less Burdensome Cannot Meet Legal Requirements

Alternative techniques exist, such as sampling and projection, that could make the salary determination and payment process less time-consuming and less burdensome; however, they cannot meet legal requirements. Given the moderately burdensome nature of the current system, we reviewed the current salary determination method and explored whether alternatives could take less time. While these alternatives might be more efficient, they would not be in compliance with the law. For instance, DOD could project overseas teachers' salaries each year based on the degree to which salaries for U.S. urban teachers increased in past years. By projecting teacher salaries the salary schedule could be completed prior to the beginning of the school year, rather than near the end. This would eliminate the need to pay teachers retroactively, thus saving time and money. However, because projections would not guarantee the same result as the survey, this method would not meet the law's requirement that DOD overseas teachers' salaries be "equal to" the salaries of U.S. urban teachers. Therefore, DOD would still have to survey the U.S. schools, and pay any difference between the projections and the survey results to the teachers retroactively. While alternative methods of salary determination exist, such as sampling, they would not reduce the workload or administrative burden. For more information on alternative salary determination techniques, see appendix I.

Conclusions

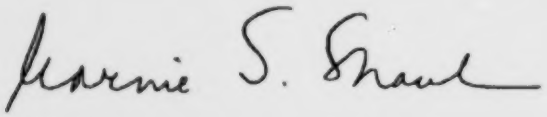
DOD overseas schools play a critical role, educating more than 70,000 children of parents in the armed services and the federal civilian workforce. To date, agency officials have successfully recruited and maintained a well-qualified teacher workforce for these schools. These well-trained teachers could be a major factor behind the schools' high student-achievement level. While the salary determination and payment process is time consuming and involves some administrative burden, DOD's success recruiting and retaining well-qualified teachers indicates that there is no immediate need to change the law.

Agency Comments

The Department of Defense provided oral comments on a draft of this report. DOD concurred with the content of the report. DOD also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the Secretary of Defense, appropriate congressional committees, and other interested parties. We will also make copies available to others upon request. In addition, this report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staffs have any questions about this report, please call me at (202) 512-7215. Other contacts and contributors to this report are listed in appendix II.



Marnie S. Shaul
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Income Security Issues

Appendix I: Scope and Methodology

The National Defense Authorization Act for fiscal year 2002 directed GAO to assess whether the Department of Defense (DOD) overseas teachers' compensation package is adequate to recruit and retain qualified teachers and to recommend any necessary revisions to the law governing DOD overseas teachers' salaries.

To address the issues raised in the mandate, we developed three key questions:

1. What is the compensation package for teachers in DOD overseas schools, and how does it compare to compensation for teachers in the United States?

2. To what extent do DOD overseas schools experience difficulties recruiting and retaining well-qualified teachers?

3. What is the process for determining teacher salaries and paying teachers, and which aspects of the process, if any, could be improved?

To answer question one, we reviewed laws, regulations, and policies on salary, benefits, and allowances for DOD overseas teachers[1] and other federal civilian employees overseas. We also analyzed salary data on DOD overseas teachers and U.S. teachers and conducted a literature review on teacher compensation in the United States. Finally, we interviewed DOD officials to confirm our understanding of the total compensation package and eligibility rules related to benefits and allowances.

To answer question two, we analyzed data on DOD overseas teachers (such as the number of newly hired teachers in each of the past three years; the number of teachers in each school; the number of teachers hired from the United States; the number hired from overseas; and the number

[1]The Defense Department Overseas Teachers Pay and Personnel Practices Act fixes the compensation for traditional classroom teachers, as well as other teaching positions. It defines teaching positions as "duties and responsibilities which involve...(i) classroom or other instruction or the supervision or direction of classroom or other instruction; or (ii) any activity (other than teaching) which requires academic credits in educational theory and practice equal to the academic credits in education theory and practice required for a bachelor's degree in education from an accredited institution of higher education; or (iii) any activity in or related to the field of education..." In addition, the National Defense Authorization Act for Fiscal Year 1997 (Pub.L. 104-201) amended the act by adding to the definition of teaching position "[duties and responsibilities] are performed by an individual who carried out certain teaching activities identified in regulations prescribed by the Secretary of Defense."

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who are spouses of DOD military or civilian employees) and reviewed DOD promotional materials, planning documents, and information provided to teachers in the DOD overseas school system. We also interviewed DOD officials and representatives of the two teachers' unions that represent DOD overseas teachers. Finally, we conducted a literature review on teacher quality and its relation to student performance.

To answer question three, we reviewed laws, court cases, arbitration documents, regulations, and policies on the DOD overseas teacher salary determination and payment process. We also interviewed DOD officials about implementation of this process and its impact on the agency. Finally, we explored alternative ways to determine and pay teacher salaries that could potentially improve efficiency and reduce costs. Specifically, we considered the use of sampling and salary projection.

Alternative Techniques for Determining and Paying Teacher Salaries

Sampling

We explored stratified sampling as one possible way to determine DOD overseas teachers' salaries. Using a sample would allow DOD to contact fewer schools to obtain salary data, thus potentially saving time and money. Estimates derived from stratified random samples are typically more precise than estimates derived from simple random samples of the same size.[2]

Currently, DOD surveys 231 urban school districts. DOD provided us with data on four salary/education categories, the BA minimum salary (BA min), the BA maximum salary (BA max), the Ph.D. minimum salary (Ph.D. min), and the Ph.D. maximum salary (Ph.D. max), for each of the

[2]In a stratified random sample, the population is divided into a number of subpopulations, called strata. An independent probability sample is drawn from each stratum. In a simple random sample, the independent probability sample is drawn from the entire population. Stratification improves the precision of the estimates because the variance within each stratum is often lower than the variance in the overall population.

231 urban school districts it surveyed for school year 2001-02. We defined strata by dividing the population, all 231 districts, into three groups, based on salary data. We defined the low stratum as those school districts with a BA min value of $28,533 or lower, the high stratum as those school districts with a Ph.D. max of $62,413 or greater, and the medium stratum as any district that did not fall into either of the other strata. This stratification resulted in 60 school districts for the low stratum and 70 districts for the high stratum; the remaining 101 districts were placed into the medium stratum.

We examined four different sample sizes: a 20 percent sample, a 30 percent sample, a 40 percent sample, and a 50 percent sample. For instance, for the 20 percent sample we selected 20 percent of the districts in the low stratum, 20 percent of the districts in the medium stratum, and 20 percent of the districts in the high stratum. Table 5 shows the total number of sample districts and the number in each stratum for the four different sample sizes before any adjustment for nonresponse.[3]

Table 5: Number of Districts Sampled by Sample Size and Strata

Sample strata	20% sample	30% sample	40% sample	50% sample
Low stratum	12	18	24	30
Medium stratum	21	31	41	51
High stratum	14	21	28	35
Total	**47**	**70**	**93**	**116**

Source: GAO analysis.

For the four sample size options, we determined margins of error for the average salaries in each of the four education/salary categories. The margin of error is a measure of how precise the estimates of the average salary are and refers to the fact that these estimates will differ from the average salary calculated using the overall population.[4] These margins of error are presented in table 6.

[3]There may be some nonresponse with the data because some school districts may not report data for each salary/education category.

[4]The margin of error reflects sampling error; it is the error that results from taking one sample instead of examining the whole population. The smaller the margin of error, the more precise is the estimate of the average salary.

Table 6: Estimated Margins of Error for Selected Sample Sizes, at 95% Confidence

Salary variable of interest	20% Sample stratified sample size of 57	30% sample stratified sample sze of 85	40% sample stratified sample size of 113	50% sample stratified sample size of 141
BA minimum	+/- $793	+/- $605	+/- $486	+/- $397
BA maximum	+/- $1831	+/- $1399	+/- $1122	+/- $916
Ph.D. minimum	+/- $924	+/- $706	+/- $566	+/- $462
Ph.D. maximum	+/- $1266	+/- $967	+/- $776	+/- $633

Note: The original sample sizes were increased to account for potential nonresponse. The nonresponse adjustment takes into account that some of the values for the four salary variables are missing.

Source: GAO analysis.

For both the 20 percent sample and the 30 percent sample, at a confidence level of 95 percent, the margins of error in each of the four education/salary categories were all within +/- $1,900 for the average salary.[5] For both the 40 percent sample and the 50 percent sample the margins of error were all within +/-$1,200, at a confidence level of 95 percent. This means that DOD could reduce the size of the annual survey from roughly 230 districts to 141[6]—in the case of the 50 percent sample—with estimated margins of error ranging from +/- $397 to +/- $916, depending on the salary variable. In other words, we would expect with a 95 percent level of confidence that the average BA min salary calculated from the sample would be within +/- $397 of the average salary calculated from the entire survey population.

Initially, DOD would have to survey all districts to define the strata but in subsequent years it would rely on this stratification to draw its sample. However, DOD's efforts to sample would be affected by the stability of the salary strata used. If the school districts in the sample frequently changed strata, then over the course of several years of using the original stratification definitions, there would be increased variability in the estimation. We tested for stability by using DOD's actual data for 3 years,

[5]Confidence intervals are used to indicate the precision of an estimate. If we could take repeated samples from our population and construct a confidence interval for each sample mean, we can expect 95 percent of the resulting intervals to include the true value of the population mean.

[6]See note on table 6.

and found that there was a substantial shift of schools across strata over time.

To examine the stability of our strata, we used the salary data DOD provided us for each of the urban school districts it surveyed in school years 1999-00, 2000-01, and 2001-02. Taking the data from the first year, we grouped the school districts into three strata: low, medium and high. We defined the low stratum as those school districts with a BA min value of $27,000 or lower,[7] the high stratum as those with a Ph.D. max of $57,000 or greater, and the medium stratum as those that did not fall into either of the other strata. This same stratification scheme was used for 2 additional years of school district salary data. Thus, the strata definitions were based on the salary data from the first year. In subsequent years, some districts moved from one stratum into another. As they did so, the original stratification no longer reflected the most recent ranking of the school districts' salaries. As a result, the margins of error for the average salary in each education/salary category increased. For example, the margin of error for the BA min average salary increased from +/- $440.60 in the base year to +/- $697.80 in the third year. In other words, there was a 26 percent deterioration over one year and a 60 percent deterioration over 2 years for the BA min category. Considering the four education/salary categories, the larger the percent deterioration, the greater the movement of districts across strata and the less stable the strata. Table 7 shows the increased margin of error over time, the percent deterioration over time and the salary ranges for each of the four education/salary categories.

[7]These strata definitions differ somewhat from those used for sample size determination. For this stability analysis, we developed strata definitions based on salaries in school year 1999-00, and determined the extent of the deterioration of the stratification over time by using three years of salary data, including 1999-00. However, for sample size calculations, we used the most recent data available, school year 2001-02 salaries, to determine strata definitions.

Table 7. Stability Results Across 3 Years

Variable of Interest	Year I 1999-2000	Year II 2000-2001	Year III 2001-2002
BA Min			
Estimated Margin of Error	440.6	557.0	697.8
% Deterioration over Time	(Base Year)	26.4%	58.3%
Actual Mean	$ 29,124	$ 30,701	$ 31,776
95% Confidence Interval	$ 28,683 – $ 29,565	$ 30,143 – $ 31,258	$ 31,077 – $ 32,474
BA Max			
Estimated Margin of Error	1,395.8	1,411.1	1,446.0
% Deterioration over Time	(Base Year)	1.1%	3.6%
Actual Mean	$ 43,490	$ 45,778	$ 46,644
95% Confidence Interval	$ 42,094 – $ 44,887	$ 44,366 – $ 47,189	$ 45,198 – $ 48,091
PHD Min			
Estimated Margin of Error	676.8	731.2	846.8
% Deterioration over Time	(Base Year)	8.0%	25.1%
Actual Mean	$ 35,227	$ 36,927	$ 38,169
95% Confidence Interval	$ 34,549 – $ 35,904	$ 36,195 – $ 37,659	$ 37,322 – $ 39,016
PHD Max			
Estimated Margin of Error	886.0	1,048.3	1,167.2
% Deterioration over Time	(Base Year)	18.3%	31.7%
Actual Mean	$ 55,259	$ 58,106	$ 59,800
95% Confidence Interval	$ 54,372– $ 56,145	$ 57,057 – $ 59,155	$ 58,632 – $ 60,968

Note:

The percent deterioration was calculated as follows:

$$\%\ \text{deterioration in one year} = \frac{\text{margin of error in year I} - \text{margin of error in year II}}{\text{margin of error in year I}}$$

$$\%\ \text{deterioration in 2 years} = \frac{\text{margin of error in year I} - \text{margin of error in year III}}{\text{margin of error in year I}}$$

Thus, the percent deterioration—increase in the margin of error—can be gauged from the base year, Year I (1999-2000), to Year III (2001-2002).

Source: GAO analysis of DOD data.

As noted above, the estimated margin of error and the percent deterioration over time indicate that there was considerable shifting over time of districts across strata for all salary/education categories except the BA max. Consequently, if sampling were used, the strata would need to be redefined and new samples selected frequently in order to minimize the

variability in the salary estimates. To do this, the entire population of urban school districts would need to be surveyed.

Projection

We explored projection as a way for DOD to pay overseas teachers their current-year salaries from the beginning of the school year, rather than retroactively. Our projections and the associated margins of error are shown in table 8.

Table 8: Projections of Mean Salary for School Year 2001-2002

Variable of interest	Projection equation	Actual mean salary 2000-2001	Actual mean salary 2001-2002	Projected mean salary 2001-2002	Projected mean 95% margins of error
BA min	Y = 1.0557 * X	$ 30,701	$ 31,776	$32,411	+/- $2,893
BA max	Y = 1.0504 * X	$ 45,778	$ 46,644	$48,085	+/- $4,155
PhD min	Y = 1.0472 * X	$ 36,927	$ 38,169	$38,670	+/- $3,851
PhD max	Y = 1.0525 * X	$ 58,106	$ 59,800	$61,157	+/- $5,127

Source: GAO analysis of DOD data.

We made our projections for 2001-02 based on DOD salary data from school years 1999-00 and 2000-01. We applied a rate-of-change model to the first two years of data to calculate estimates of the annual rate of change for each of our four education/salary categories. Our model took the form

$$Y = aX$$

where

a is the estimated rate of change

X is the salary from school year 1999-00, and

Y is the salary from school year 2000-01.

Having calculated values for a, we then substituted in values for school year 2000-01 for X in order to calculate projected average salaries for school year 2001-02.

As an example, to calculate the projected mean salary in school year 2001-02 for the BA min category, we used the equation in column two (Y=1.0557*X). For X we substituted 30,701, the value in column three, the actual mean salary for school year 2000-01. Multiplying this value times 1.0557 (the mean increase for BA min from school year 1999-00 to school year 2000-01) gave us the projected mean salary for school year 2001-02 displayed in column five. This projected mean salary will not be the same as the actual mean salary, because salary projections include an assumption about the annual rate of growth in earnings, and this assumed growth rate is likely to differ from the actual growth rate. In the particular examples shown, the mean salaries we projected were similar to the actual mean salaries.[8] However, the projections could fall anywhere between the confidence limits, indicating the variability attached to these projections. Table 7 shows that the 95 percent confidence interval for the BA min salary would range from $29,518 to $35,304.

[8]Statistical testing showed that the actual and projected mean salaries were not significantly different.

Appendix II: GAO Contacts and Staff Acknowledgments

GAO Contacts

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Staff Acknowledgments

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